We claim:

1. An electric current producing rechargeable polymer battery comprising a positive electrode, a negative electrode and a composite polymer electrolyte interposed between said electrodes, said composite polymer electrolyte comprising a mixture containing a finely-divided inorganic oxide and an organic polymer, gelled with a non-aqueous electrolyte solution containing a lithium salt in an organic solvent, said composite polymer electrolyte serving also as a separator medium electronically insulating said electrodes while transporting lithium ions therebetween.

2. The rechargeable polymer battery of claim 1 wherein said composite polymer electrolyte is in the form of a thin film coating applied to at least one of said positive and negative electrodes.

3. The rechargeable polymer battery of claim 2 wherein said composite polymer electrolyte comprises from about 50 to about 95 percent by weight inorganic oxide and from about 5 to about 50 percent by weight organic polymer.

4. The rechargeable polymer battery of claim 3 wherein said inorganic oxide is selected from the group consisting of aluminum oxide (Al_2O_3), titanium oxide (TiO_2), silicon oxide (SiO_2) and mixtures thereof.

5. The rechargeable polymer battery of claim 4 wherein said organic polymer

is selected from the group consisting of poly(vinylidene fluoride)-hexafluoropropene copolymer, (PVDF-HFP), poly(ethylene oxide), poly(propylene oxide), polyacrylonitrile , poly(vinyl pyrrolidinone) and mixtures thereof.

6. The rechargeable polymer battery of claim 5 wherein said inorganic oxide is silicon oxide (SiO_2) and said organic polymer is poly(vinylidene fluoride)-hexafluoropropene copolymer, (PVDF-HFP).

7. The rechargeable polymer battery of claim 5 wherein said lithium salt is selected from the group consisting of $LiAsF_6$, $LiPF_6$, $LiBF_4$, lithium imidazolide bis-(boron trifluoride), $LiN(O_2SCF_3)_2$, $LiN(O_2SC_2F_5)_2$, LiBOB, $LiClO_4$, and mixtures thereof.

8. The rechargeable polymer battery of claim 7 wherein said organic solvent is selected from the group consisting of organic carbonates, esters, ethers, lactones and mixtures thereof.

9. The rechargeable polymer battery of claim 8 wherein said organic solvent is a mixture of a cyclic carbonate and an acyclic carbonate.

10. The rechargeable polymer battery of claim 9 wherein said cyclic carbonate is ethylene carbonate and said acyclic carbonate is selected from the group consisting of dimethyl carbonate(DMC), diethyl carbonate(DEC), ethylmethyl carbonate

and mixtures thereof.

11. The rechargeable polymer battery of claim 8 wherein said negative electrode is selected from the group consisting of graphitic carbon, lithium metal, lithium alloys and Li intercalating transition metal compounds.

12. The rechargeable polymer battery of claim 11 wherein said positive electrode is a transition metal oxide selected from the group consisting of V_3O_8, V_6O_{13}, $LiCoO_2$, $LiMn_2O_4$, $LiNi_xM_yO_2$ where x = $0<x<0.6$ and M= Co, Mn and y =$0<y<0.6$, $LiNi_{0.33}Co_{0.33}Mn_{0.33}O_2$, and $LiMPO_4$ where M=Fe,V, Mn and mixtures thereof.

13. A composite polymer electrolyte comprising a finely-divided inorganic oxide selected from the group consisting of aluminum oxide (Al_2O_3), titanium oxide (TiO_2), silicon oxide (SiO_2) and mixtures thereof and an organic polymer selected from the group consisting of poly(vinylidene fluoride)-hexafluoropropene copolymer, (PVDF-HFP), poly(ethylene oxide), poly(propylene oxide), polyacrylonitrile , poly(vinyl pyrrolidinone) and mixtures thereof, gelled with a non-aqueous electrolyte solution containing a lithium salt in an organic solvent.

14. An electrode-electrolyte assembly for use in the fabrication of a rechargeable polymer battery comprising a thin foil of electrochemically active material and a thin coating of a composite polymer electrolyte applied to a surface of said foil, said

composite polymer electrolyte coating comprising a mixture containing a finely-divided inorganic oxide and an organic polymer, gelled with a non-aqueous electrolyte solution containing a lithium salt in an organic solvent.

15. A method of fabricating a rechargeable polymer battery comprising: providing a positive and a negative electrode;

preparing a suspension of finely-divided inorganic oxide and an organic polymer dissolved in a solvent;

coating a surface of at least one of said electrodes with said suspension;

gelling the residue from said evaporated suspension with a non-aqueous electrolyte solution containing a lithium salt in an organic solvent, and

placing said coated electrode adjacent to the other of said electrodes with said gelled coating therebetween to form said polymer battery.

16. The method of fabricating a polymer battery according to claim 15 wherein said suspension comprises from about 50 to about 95 percent by weight inorganic oxide and from about 5 to about 50 percent by weight organic polymer.

17. The method of fabricating a polymer battery according to claim 16 wherein said inorganic oxide is selected from the group consisting of aluminum oxide (Al_2O_3), titanium oxide (TiO_2), silicon oxide (SiO_2) and mixtures thereof and wherein said organic polymer is selected from the group consisting of poly(vinylidene fluoride)-

hexafluoropropene copolymer, (PVDF-HFP), poly(ethylene oxide), poly(propylene oxide), polyacrylonitrile , poly(vinyl pyrrolidinone) and mixtures thereof.

18. The method of fabricating a polymer battery according to claim 17 wherein said lithium salt is selected from the group consisting of $LiAsF_6$, $LiPF_6$, $LiBF_4$, lithium imidazolide bis(boron trifluoride), $LiN(O_2SCF_3)_2$, LiN(O2SC2F5)2, LiBOB, $LiClO_4$, and mixtures thereof and wherein said organic solvent is selected from the group consisting of organic carbonates, esters, ethers, lactones and mixtures thereof.

19. The method of fabricating a polymer battery according to claim 18 wherein said negative electrode is selected from the group consisting of graphitic carbon, lithium metal, lithium alloys, and Li intercalating transition metal compounds and wherein said positive electrode is a transition metal oxide selected from the group consisting of V_3O_8, V_6O_{13}, $LiCoO_2$, $LiMn_2O_4$, $LiNi_xM_yO_2$ where $x = 0<x<0.6$ and M= Co, Mn and $y =0<y<0.6$, $LiNi_{0.33}Co_{0.33}Mn_{0.33}O_2$, and $LiMPO_4$ where M=Fe,V, Mn and mixtures thereof.

20. The method of fabricating a polymer battery according to claim 19 wherein said suspension comprises fumed silica in a solution of poly(vinylidene fluoride)-hexafluoropropene copolymer (PVDF-HFP) in N-methyl pyrrolidinone and ethyl alcohol.